# GARDEN AND FOREST.

PUBLISHED WEEKLY BY

THE GARDEN AND FOREST PUBLISHING CO.

OFFICE: TRIBUNE BUILDING, NEW YORK.

Conducted by . . . . . Professor C. S. SARGENT.

ENTERED AS SECOND-CLASS MATTER AT THE POST OFFICE AT NEW YORK, N. Y.

NEW YORK, WEDNESDAY, JANUARY 17, 1894.


TABLE OF CONTENTS.


| | PAGE. |
|---|---|
| EDITORIAL ARTICLES:—Street Trees | 21 |
| The Supply of White Pine Diminishing | 21 |
| Boston's New Metropolitan Parks.—*Sylvester Baxter.* | 22 |
| Botanical Notes from Texas.—XV.—*E. N. Plank.* | 23 |
| The Red Mulberry-tree. (With figure.) | 23 |
| PLANT NOTES:—Hybrid Nymphæas.—*M. Latour-Marliac.* | 24 |
| CULTURAL DEPARTMENT:—Spraying Apple Orchards.—*E. G. Lodeman.* | 25 |
| Vegetables in the Greenhouse.—*T. D. Hatfield.* | 26 |
| Forcing-houses in Dark Climates—Damping Off.—*Professor L. H. Bailey.* | 26 |
| Ipomœa Leari.—*W. E. Endicott.* | 27 |
| The Otaheite Orange.—*E. P. Powell.* | 27 |
| Hardy Andromedas.—*J. Meehan.* | 27 |
| Begonia Gloire de Lorraine, Calochortus Kennedyi.—*J. N. Gerard.* | 27 |
| CORRESPONDENCE:—Horticultural Progress in France.—*X.* | 27 |
| Local Climates in California.—*Carl Purdy.* | 28 |
| RECENT PUBLICATIONS | 28 |
| NOTES | 29 |
| ILLUSTRATION:—A Red Mulberry-tree, Morus rubra, in Alabama, Fig. 3 | 25 |


## Street Trees.

LAST September Mr. L. Collins, Secretary of the Tree-planting and Fountain Society of Brooklyn, wrote a circular letter to several nurserymen and other experts, asking them to name what they considered the best trees of different sizes to use as shade-trees in the streets of Brooklyn, and the answers which this letter called forth have recently been published in the newspapers of that city.

The trees recommended are, for the most part, suitable for the purpose, although it is curious that only one writer recommends the Ailanthus, which is probably the best street tree that has ever been used in northern cities, in spite of the prejudice which exists against it, and which, as is explained in the letters alluded to, can be overcome by planting only pistillate trees. Some of the trees recommended, however, are hardly suitable for street-planting. One writer recommends the European Ash, which is notoriously a short-lived and unhealthy tree here, like the European Sycamore Maple, which is also recommended. The American Chestnut is recommended, but, in common with other nut trees, it has the disadvantage of being too attractive to boys, who climb into the branches or mutilate the trees with sticks and stones in their pursuit of the nuts. Nor should we consider the Ash-leaved Maple, although a rapid-growing tree, a desirable inhabitant of our streets; it branches too low, and the branches are too brittle to make it desirable in such situations. Nor is the Canoe Birch, which is recommended a good street tree, as all the Birches need their lower branches to balance the narrow pyramidal heads, and street trees, of course, cannot be allowed to branch low. Catalpa speciosa is also recommended, but, although a hardy and fast-growing tree, it has the disadvantage of producing such showy flowers that the trees in public places rarely escape mutilation. Nor do we agree with the assertion of one of the writers that "for village streets or country roadsides there is nothing finer than the European Beech." A Beech to be really beautiful must rise in a solid dome of foliage from the grass, and specimens from which the lower branches have been removed are not attractive. One writer recommends the Lombardy Poplar and the variety of the Silver Poplar, known as Populus Bolleana, both fastigiate trees of rapid growth, but, unfortunately, now practically worthless in this country, owing to the attacks of borers, which riddle the trunks. The Mountain Ash, too, is recommended, but the beauty of the too attractive fruit would prove a serious objection to this tree. The Yellow Wood, or Cladrastis, is suggested; it is one of the most charming of our native trees, but hardly suitable for a street tree, as it usually branches low, and has one serious drawback in its brittle branches which are often broken by gales. Nor should we have thought of Magnolia conspicua, or Cornus florida, as desirable street trees, for both produce such showy flowers that it would be impossible to save them from mutilation.

Several of the writers recommend the weeping cut-leaved European Birch, but to this there is the same objection as there is to the Canoe Birch; these trees are beautiful when they grow from the ground as pyramids; they become unsightly and unattractive as soon as the lower branches are removed. The Locust, Robinia Pseudacacia, is suggested, but, like the Lombardy Poplar, it is unavailable through the injuries inflicted on it by borers. Most of the writers agree in recommending the Tulip-tree, the Red Oak, the Sugar Maple, the Norway Maple, the Pin Oak—all excellent trees, and, on the whole, perhaps the best large-sized trees available for our streets. The Oriental Plane, which promises to be a valuable tree here, and to surpass in utility the American species, which serious fungal diseases disfigure, is recommended. The Three-thorned Acacia, or Gleditschia, and the Kentucky Coffee-tree are both recommended, and both are tough and handsome trees, which have the advantage of leafing out late in the spring, and thus allowing the sun to reach the ground beneath them at a season when it is agreeable.

The selection of trees of the right kind is necessary if a plantation, whether it be in a street or elsewhere, is to be permanently successful, but, after all, a wise selection of material is not the only thing that is needed. It is equally important that an abundant supply of proper soil should be furnished to each tree, that the trees should be carefully grown in nurseries, frequently transplanted and properly pruned until they attain a proper height for permanent planting. They should be carefully staked as soon as planted and protected against the teeth of horses by some efficient trunk-guard. If street trees are planted as they are in Paris—in such a way that it is possible to supply them freely with water in periods of drought—the success of the plantations will be greater and the life of the trees prolonged. In a city of the size of Brooklyn tree-planting can only be properly and economically carried out with the assistance of a municipal nursery, in which trees are specially grown and prepared for the purpose. This plan has been successfully adopted in Paris and in Washington, which pass for the two best-planted cities in the world, and should always prevail where planting on a large scale is to be undertaken.

---

WHEN the earlier bulletins of the Tenth Census called attention to the fact that the supply of white pine in the country was rapidly diminishing, the statements were at first denied with a good deal of energy. Since that time, however, the scarcity of good pine has become evident, and of late years other woods have been employed more and more in place of this lumber. An article in a recent number of the *Northwestern Lumberman* on "Lumber for House-finishing," begins with the assertion that as a material for doors, windows and interior trimming of the medium and cheaper class of houses the use of white pine will henceforth constantly diminish. This is not because this wood is less esteemed, but because the supply is becoming more and more inadequate to the requirements. If good white pine were now, as in the past, the main dependence for finishing-wood, there would not be nearly enough to meet the demand. As long as any

white pine remains it will be used to the extent of its available supply, but the average size of standing Pine is diminishing, and that means that the percentage of good lumber is depreciating. In other words, the gross supply is not only getting smaller as years pass, but the time is at hand when the amount of finishing-stock which can be obtained from a given quantity of logs will be exceedingly small.

Since large supplies of timber must be carried for general house-finishing, it will not do to depend on woods with a scattered and limited supply. Cherry, birch, sycamore and butternut can all be employed to a certain extent, but they cannot be depended upon for general factory work because of the difficulty of accumulating any quantity of such lumber. Besides this, the factory lumber for general use must comprise a large portion of wood which is soft enough to be easily worked, and although the tendency is to use hard woods in the better class of houses, and altogether in structures of the highest class, nevertheless, in the majority of dwellings for the people, and in cheaper kinds of business-buildings, woods which are easily worked must be used, and the material must be readily obtained and furnished to the market in large quantity. To the question which is thus forced upon builders, as to what will be the main dependence for sash, doors and interior trimming, *The Lumberman* answers that experience has already proved that oak will lead among the deciduous woods, because it is most abundant and widely prevalent, adaptable and cheap. It is the only wood of which no one complains, and fortunately the supply is still abundant, and it can be had at a much lower price than good pine. If it were not for the cost of working, oak would be the cheapest good finishing-wood for a house, but the contractors who wish to hurry buildings and slight their work under strong competition, do not like to work oak because it must be handled with more care than softer woods. Nevertheless, it will continue to lead as a finishing-wood when substantial work is required. Yellow pine is now largely used for finishing in the place of northern pine. It is abundant and cheap; the mills and factories take kindly to it, and it is susceptible of finish in natural color or to receive paint. Treated with shellac and oil, it is almost as hard as oak. It is taking the place of white pine as a general factory wood. and, with oak, it will be the principal wood for years to come for house-finishing. Freight rates are too high to bring the fir, spruce, cedar and red-wood of the Pacific coast in competition with yellow pine. But southern cypress will probably be used more and more. It is light, it runs wide, transports at a reasonable cost, has much of the workable quality of white pine, can be finished with little waste, and is a handsome wood. Ash, poplar, gum, maple and other woods may be utilized for special purposes, but it remains true that the three woods which will be used for finishing houses as the white pine becomes more scarce are oak, yellow pine and cypress.

---

## Boston's New Metropolitan Parks.

WHEN the report of the Boston Metropolitan Park Commission was outlined in these columns less than a year ago, it seemed like an ideal project; so comprehensive, so well considered, and so far-seeing as to be, like most ideals, beyond prospect of any speedy attainment. Yet some of its most important features have been already realized, and others are assured. Public sentiment in relation to park improvements appears to have developed here to a most enlightened degree in the past few years. It was only in 1891, that the first suggestion was made for a system of parks adequate to meet the needs of the great cluster of cities and towns that, with the city of Boston, forms practically one metropolitan community. The next year, the preliminary Metropolitan Park Commission was appointed. The suggestions made in its important report last winter were embodied in the form of law, and to carry out its objects the sum of one million dollars was placed at the disposal of the permanent commission appointed for the purpose.

This commission has been actively at work since its organization. Mr. Charles Eliot, who was the landscape-architect to the preliminary commission, having become associated with the Olmsteds, in the new firm of Olmsted, Olmsted & Eliot, that house was appointed to hold the same relation to the permanent commission. The plans involved work of the most interesting and attractive kind for the landscape-architect, and Mr. Frederick Law Olmsted has pronounced the various features of the scheme as presenting the finest opportunity that has come before him of dealing with lands specially fitted by nature for public recreative uses.

The first reservation that has been made by the commission is a minor one in respect to area, but of great importance as to its natural features. This is the tract containing the famous group of ancient Oaks, latterly known as the "Waverley Oaks," but more properly designated as "the Beaver Brook Oaks," situated near Waverley station on the line of the Fitchburg and the Central Massachusetts division of the Boston & Maine Railroads. This place was described and the Oaks figured in Garden and Forest (volume iii., page 85). (See also the articles in volume v., pp. 371, 386.) The reservation taken by the commission makes a charming recreation-ground of fifty-eight and a half acres, situated in the city of Waltham and the town of Belmont. It includes not only the lovely pastoral tract occupied by the noble old Oaks, the finest trees of the kind in New England, but also the beautiful Beaver Brook cascade sung by Lowell, and the two small ponds above. Altogether, the Beaver Brook Reservation, as it is called, is one of the most delightful spots in the Boston neighborhood. Mr. Edwin F. Atkins and Mrs. Elisha Atkins, of Belmont, generously gave $12,500 toward the expense of the taking, the contribution of the former amounting to $10,000.

For its second taking the commission has had the most extensive feature of its scheme. The beautiful mountain-like range of the Blue Hills, whose reservation as a "Massachusetts Forest" was urged in an article in Garden and Forest (vol. iv., p. 362), is now a public domain for almost its entire length, from its high western summit to its eastern foot-hills. This reservation, with a length of about five miles and an area of 4,000 acres, is the largest single park-space possessed by any American city. It is only to be compared with the broad forest-domains in the neighborhood of the great European capitals, and in many respects is superior to London's famous Epping Forest.

Like the Lynn Woods, the Blue Hills revert to public ownership after a lapse of nearly two centuries. In 1711 the town of Boston sold its "Blue Hill lands" in Braintree, 3,000 acres in extent, to four persons for a few thousand dollars. The cost of the present taking will probably be at least $200,000, but the public advantage will make that a cheap price. The lands are almost as wild to-day as they were when Boston sold them.

This great reservation will include eleven prominent summits, wild and rocky, but gently undulating for the most part, and forming many enchanting prospects from the city, the bay and the surrounding country. The greatest elevation, the Great Blue Hill, has a height of 635 feet above sea-level, and being seen from near the level of the sea it has the aspect and dignity of a goodly mountain. It is the highest land near the sea on the entire Atlantic and Gulf coast, from the Piscataqua, where Agamenticus rises in southern Maine, to the Rio Grande. The prospect is a glorious one, commanding a wide stretch of the coast and a vast expanse of Boston and Massachusetts Bays; clusters of cities, towns and villages containing a third of the population of Massachusetts; broad inland views, from Mount Wachusett to more than a dozen prominent peaks in southern New Hampshire; and, southerly, a sylvan expanse that seems almost as unbroken a woodland wilder-

ness as when the land was first trod by white men, so thoroughly do the trees veil the habitations and clearings of man. Here the surfaces of several beautiful lakes glisten in the sunlight. One of these, Hoosicwhisic Pond, is directly at the southern base of the range, and is included in the reservation. Two other larger ones, Ponkapoag and Massapoag, are not far away.

The reservation lies in the towns of Milton and Canton, and the city or Quincy. It is within eleven miles of the state-house in Boston, and three miles of the city boundary. The Blue Hills have a great historic interest in the fact that they gave the name to the state of Massachusetts, which, meaning "the place of the great hills," was told to Captain John Smith by the Indians when he explored the coast of New England in 1614. He therefore called the Blue Hills "Massachusetts Mount" on his map. When this map was shown to Prince Charles, the royal boy changed the name to Chevyot Hills. But the more common-place name of "Blue Hills" obtained. The name of "Massachusetts Mount" should at least be restored to the Great Blue.

The metropolitan commission has in contemplation the taking of the Middlesex Fells region to the northward of Boston, and a beautiful tract of wild wood-land in the West Roxbury district of Boston and the town of Hyde Park, including the highest elevation in the city limits, known as Bellevue hill, and a tarn locally known by the unattractive name of Moddy Pond. The city of Boston proposes to build a fine parkway connecting the Arnold Arboretum with this spot, and the highway known as Blue Hill Avenue is to be changed into a boulevard from Franklin Park southward.

Together with the Lynn Woods, these three features of the Boston Metropolitan park system will have a total area of something near 10,000 acres. The taking of the shore-front of Revere Beach, with a length of something like two miles of curving sands, and within twenty minutes of the business centre of Boston, is also in contemplation for the near future.

*Sylvester Baxter.*

## Botanical Notes from Texas.—XV.

BEEVILLE is a little town about one hundred miles south of San Antonio and fifty miles from the Gulf of Mexico. The soil in this vicinity is generally sandy, and there are some rocky points along the arroya, which extends through the town. A few interesting and rare plants grow in Bee County.

Liatris elegans, found in the more eastern Gulf states, has immigrated to south-western Texas, and is becoming well distributed. This variety is by far the handsomest of our species of Liatris, and is worthy of a place in any garden. The large involucres of the flower-clusters are petaloid, and they are here colored blue, or rarely rose-colored. The flowers themselves, so far as seen, are whitish. The strict stalks are floriferous almost their entire length of two to three feet. The short rigid leaves are usually reflexed. I have not seen the species elsewhere in the state.

Pterocaulon virgatum, a strict-growing and singular-looking composite, abounds in southern Texas in sandy sterile places from Bee County eastward to Harris County, as a recent trip over the intervening country has shown. The species may readily be recognized by its narrowly oblong, sharply pointed leaves, which are whitened on the under face, and by its alate stems, which gave the plant its generic name, Winged-stem. The yellowish flowers are disposed in remote, spike-like clusters.

I met at Beeville, for the first time, the beautiful little Polygala Lindheimeri. It is a slight species, growing here from six to ten inches tall. It has purple flowers and oblong truncated fruit. It is well suited for living in a dry country, having a deep-growing woody root of a red color. The species is rare.

Galactia marginalis, like its congener, G. heterophylla, has deviated from the generally trifoliate form of leaves which the genus possesses, but in a different direction, it having suppressed two of its leaflets, and become unifoliate. The leaflets are an inch or two long and lanceolate in form. On its lower face the leaflet is circumscribed by a strong nerve, a peculiarity which led Bentham to give the plant its specific name. It is enabled to live through times of drought and of hard fare generally, having a deeply planted oblong tuber. Its flowers, which are large for the genus, are dark purple in color.

Cassia procumbens, a diminutive prostrate plant, grows about Beeville. The species is not common in Texas. Its yellow flowers are large, and the leaflets of this species, like those of many of its congeners, are sensitive, closing at the slightest touch. C. chamæcrista is the commonest Cassia in the state, and covers fields of unoccupied land everywhere. Its leaves also are very sensitive.

The city of Leyden, in Holland, built a monument to the memory of Boerhaave, their great botanist and physician. His pupil and protégé, Linnæus, dedicated to his preceptor and patron a more lasting monument, in the genus Boerhaavia, of which there are at least two Texas species, B. erecta and B. viscosa. B. erecta is common in Texas and eastward and westward of this state. Its stems are ascending or erect, bearing on their lower portion numerous fleshy ovate leaves, green above and whitened below, and becoming above nearly naked, spreading panicles of light purple flowers, succeeded by slender club-shaped fruits. B. viscosa is prostrate unless it is helped to rise by other plants. It is a strong and vigorous plant. On the sands of the coast it sometimes throws out prone branches four to six feet long. Its habit is very like that of B. erecta, except in its general viscidness and its small dense heads of dark purple flowers.

Indigofera leptosepala is one of the handsomest pea-flowering plants in Texas. This species is abundant over most of Texas, and eastward through the other Gulf states, and northward through the Indian territory to Kansas, through the southern tier of counties from near the ninety-eighth meridian westward. It is a prostrate species and readily recognizable by its small scarlet flowers. Crusea allococca, formerly called a Diodia, a southern species, is often to be seen in this vicinity, forming small masses of vegetation in open fields and along railways. The handsome bright yellow flowers of Xanthisma Texana adorn the prairies of central Texas from the Gulf to Red River. It extends northward through the Indian territory. This composite is abundant near Beeville. Tephrosia Lindheimeri, a conspicuous and handsome Pea, with prostrate stems, obovate hoary leaves, and large purple flowers borne in erect racemes, can hardly be mistaken for any other plant. It grows abundantly throughout central Texas. Our silver-leaved Sunflower, Helianthus argophyllus, grows rarely in Bee County. It is very abundant near the gulf at Aransas Pass, where it is taking possession of all abandoned fields. The disk flowers of this species are purplish. What appears to be a Calliandea, though out of its reported range, is sometimes met with near Beeville. I have seen it only in fruit.

Kansas City, Kansas. *E. N. Plank.*

## The Red Mulberry-tree.

THE genus Morus, to which this tree belongs, is not a large one. One species inhabits the eastern United States; another, finding its most northern home in south-western Texas, is common on the Mexican table-lands; and a third has been found on the mountains of New Granada. In the Old World Morus nigra, now a well-known fruit-tree, cultivated in all temperate countries of the world, is supposed to be a native of Persia; the home of Morus alba is in northern China and on the island of Yezo; and on the high mountains of the islands of the Indian Archipelago are two or three other Mulberries, which botanists have sometimes considered species. Of them all, the most important and interesting is Morus alba, as upon its leaves the silk-worm finds its most palatable and productive food. For a period of time that cannot be even guessed at this tree has been cultivated in China; long before the Christian era it was carried into India, and in the twelfth century was introduced into Europe, where its cultivation rapidly spread, especially in France and Italy. No other tree, perhaps, gives employment, directly or indirectly, to so many members of the human race. Few other trees produce a product of greater value; and certainly no other has been the subject of such voluminous and exhaustive literature. As might have been expected in the case of a plant which has been carefully cultivated for centuries under widely different conditions of climate and soil, the White Mulberry has produced many varieties now recognized as races, and valued for special characteristics.

The fruit of Morus, which is the aggregation of several nut-like individual fruits, each enclosed in the thick, fleshy, succulent calyx of the flower, has a pleasant aciduous flavor, and in some countries is much esteemed, the trees being grown specially for the fruit.

Our American Red Mulberry, the Morus rubra of botanists, although the color of the fruit to which it owes its name is rather dark purple, or almost black, rather than red, is a broad-branched, round and dense-headed tree, which sometimes, under exceptionally favorable conditions, grows to a height of sixty feet and produces stout trunks three or four feet in diameter. Trunks of even more noble dimensions may occasionally be met with, and on the estate of Mr. P. J. Berckmans, President of the American Pomological Society, in Augusta, Georgia, there was, a few years ago, a noble specimen with a trunk which girted nearly twenty feet at three feet above the surface of the ground.

The leaves of the Red Mulberry are of ample size, ovate, pointed, heart-shaped at the base, and, like those of other Mulberry-trees, often deeply lobed on vigorous young shoots; they are of the darkest and richest green, rough to the touch on the upper surface and coated on the lower more or less thickly with pale hairs. The flowers, like those of other Mulberry-trees, are insignificant in appearance, and are borne in unisexual, catkin-like, axillary clusters, the two sexes being produced sometimes on the same individual, and sometimes on separate individuals, the male flowers in short loose racemes and the females in dense heads. The flowers have no corolla, and consist of a minute four-parted green calyx, and either of four stamens or of a simple pistil. The fruit, which resembles a small blackberry, ripens in June and July.

The Red Mulberry is widely scattered over the territory of the United States; from western New England and Long Island it ranges west through southern Ontario to the Black Hills of North Dakota, and southward to Cape Romano and the shores of Bay Biscayne, in Florida, and to the valley of the Colorado River, in Texas. It is a tree that loves deep, rich, well-watered soil, and is usually found on the alluvial bottom-lands of streams, where it is often very abundant, especially in the region west of the Alleghany Mountains, where it grows to its largest size.

The bright orange-colored wood of the Red Mulberry is not without value, although it is soft, coarse-grained and not particularly strong; it is tough, however, and few of our woods more successfully resist decay when placed in contact with the soil. It is much used, therefore, in fencing; it is considered valuable by coopers, and in some parts of the southern states is employed in boat-building.

As a fruit-tree the Red Mulberry is not to be despised, as travelers who have had the good fortune to pass a summer nooning, well shaded from the heat of the sun, among its branches can gratefully testify. No attention has been paid to improving the fruit by selection or cultivation, as mulberries are not greatly esteemed in this country, where other fruits are plenty. There seems no reason, however, why it could not be made to equal the best European varieties in size and quality.

In ornamental planting, the Red Mulberry is valuable in some situations as a specimen, as may be seen in the illustration, on page 25, of a tree on the grounds of the Alabama Agricultural Experiment Station. This tree, which is about thirty feet in height, with a trunk circumference of more than ten feet, stands in what was a gullied "old field" when the college acquired the land some fifteen years ago. Under systematic cultivation the soil has rapidly regained its former fertility, and the tree has taken on new growth and vigor, which is seen in its rapidly increasing size and symmetry. This regularity in the outline of its head, and the denseness and the dark color of the leaves, are distinguishing marks of our Mulberry, and they are features which do not lend themselves readily to landscape-composition in which other trees of more open habit and lighter foliage predominate.

Like all the Mulberries, the American species is easily raised from seed and easily transplanted, although young seedlings are rather tender, and during their early years are the better for a little winter protection, especially in regions of more severe climate than those in which the tree grows naturally.

## Plant Notes.

### Hybrid Nymphæas.

GROWERS of Water-lilies in this country have for some years been familiar with the beautiful yellow-flowered Nymphæa called Chromatella and the later hybrids which have been produced by Monsieur Latour-Marliac, of Temple-sur-Lot, France. A late number of the London *Garden* contains a colored plate of N. Marliacea carnea, which represents a flower seven inches across, five inches high and colored creamy white, tinged with red at the base of the petals, while the stamens are a rich orange. Accompanying this is a letter from Monsieur Marliac, the greater portion of which we herewith quote, for we are sure our readers will be glad to get accurate information as to the parentage of these hybrids, together with some idea of the systematic and intelligent way in which this most successful producer of new Water-lilies is still devoting himself to the production of novel forms and colors in these beautiful plants.

About the year 1879 I commenced the work in earnest by crossing the finest types of hardy and tropical Nymphæas which I had in cultivation. These early attempts were at first negative in their results, but soon afterward I scored an unexpected success in a hybrid with deep red flowers, the seed parent of which was Nymphæa pygmæa alba, fertilized with pollen from the flowers of N. rubra Indica. Unfortunately, and to my great disappointment, this magnificent specimen proved hopelessly barren, and from it I obtained neither seeds nor offsets, so that, after having tried in vain to reproduce it, I gave up the task and turned my attention in another direction.

In order to obtain plants of a really ornamental character, it seemed especially necessary not to employ as seed parents any subjects except such as were very free-flowering, and by rigorously adhering to this principle I succeeded, little by little, by means of numerous sowings and strict selections, in raising types which were in every way improved in the form and other characteristics of their flowers. It was thus that one of these new subjects, N. alba, fertilized with pollen from the American species, N. flava, produced N. Marliacea Chromatella, which has achieved such a high reputation. In the following year I obtained the hybrid, N. odorata sulphurea, from a similar crossing of N. odorata alba with N. flava, and the last-named species has also been the pollen parent of N. pygmæa Helvola.

About the same time two species of high character made their appearance in gardens, namely, N. sphærocarpa, a native of Sweden, and the elegant N. odorata rubra, found at Cape Cod, in North America. The sparse-flowering character of N. sphærocarpa (a diminutive possible sire by the side of my first-raised hybrid) determined me to reject it for hybridizing purposes, and I gave all my attention to the fascinating American variety, N. odorata rubra, which, employed as the pollen parent, with my choicest specimen of N. alba as seed parent, rewarded me with the sweet N. Marliacea rosea and N. Marliacea carnea. N. odorata rubra was subsequently the parent of the beautiful N. odorata exquisita, the color of which is pink, approaching to carmine. As the last-raised specimen of this first group of my hardy hybrid Nymphæas, I must mention the remarkable N. Marliacea albida, the flowers of which have not yet been surpassed in size by those of any other Nymphæa.

In the year 1889 the Universal Exhibition was held at Paris, and my small collection of the above-named hybrids timidly took the road to the metropolis, to see if possibly they might attract some notice from amateurs in the midst of the plant-wonders there. Their graceful elegance, however, was appreciated, and they came back with the distinction of a first prize. The success achieved at the Universal Exhibition put fresh life into my ambition, and I applied myself to the work of effecting a cross which would produce plants with flowers of a very bright red color, much superior to the color of N. sphærocarpa and N. odorata rubra, which I had proved to be

incapable of supplying the desired improvement. After numerous experiments, I at last succeeded in obtaining a hybrid, the flowers of which are of the same color as those of the tropical N. rubra, the plant, moreover, possessing the invaluable property of bearing seed—a property all the more precious from the circumstance that it does not yield any offsets.

As I had anticipated, this hybrid could not be sent out, as its seedlings could not be relied upon to resemble it; in fact, it has produced seedlings the flowers of which exhibited a whole scale of intermediate shades of color, from soft pink to the deepest red. Those varieties, however, which it is impossible to render permanent through the failure of their stems to yield offsets, have proved very useful for hybridizing choice varieties of the stoloniferous and proliferous kinds, and it is from hybrids of this kind that I have obtained the series of those hardy novelties which, during six months of the year, embellish the waters of pleasure-grounds with a never-failing display of their splendid flowers. Most of these new plants are already catalogued under the names of N. Robinsoni, N. Seignoureti, N. Laydekeri rosea, N. liliacea, N. fulgens, N. Marliacea ignea, N. Marliacea rubra punctata and N. Marliacea flammea. Others less brilliant will soon be added to the list, several of them having been already described.

The acquisition of a red-flowered hybrid Nymphæa which yields seed has opened up a new prospect by affording the means of crossing with the yellow-flowered kinds, the result being the production of a legion of Nymphæas bearing flowers with singular shades of coloring, such as orange, vermilion and gold. Some of these splendid kinds have been already introduced to the public, the first of them which flowered being named after the editor of *The Garden*.

The blending of the Nymphæas of the Castalia tribe, which are found in various northern countries, with the Lotuses of the tropics, is now an accomplished fact; but another important task remains in the hybridizing of the Castalias with plants of the Cyanea section, which includes a great number of superb blue-flowered Nymphæas. This is a work which is well calculated to stimulate the enthusiasm of hybridizers.

In conclusion, I have to say that, notwithstanding my very great partiality for the Nymphæas, I can appreciate the stately beauty of the Nelumbiums, and I have endeavored, by making repeated sowings, to obtain some hardier and more free-flowering forms of these plants than those of exotic growth. N. Osiris, one of my seedlings, possesses these two important qualities, and I think it is destined to prove a powerful aid and factor in effecting this desirable improvement.

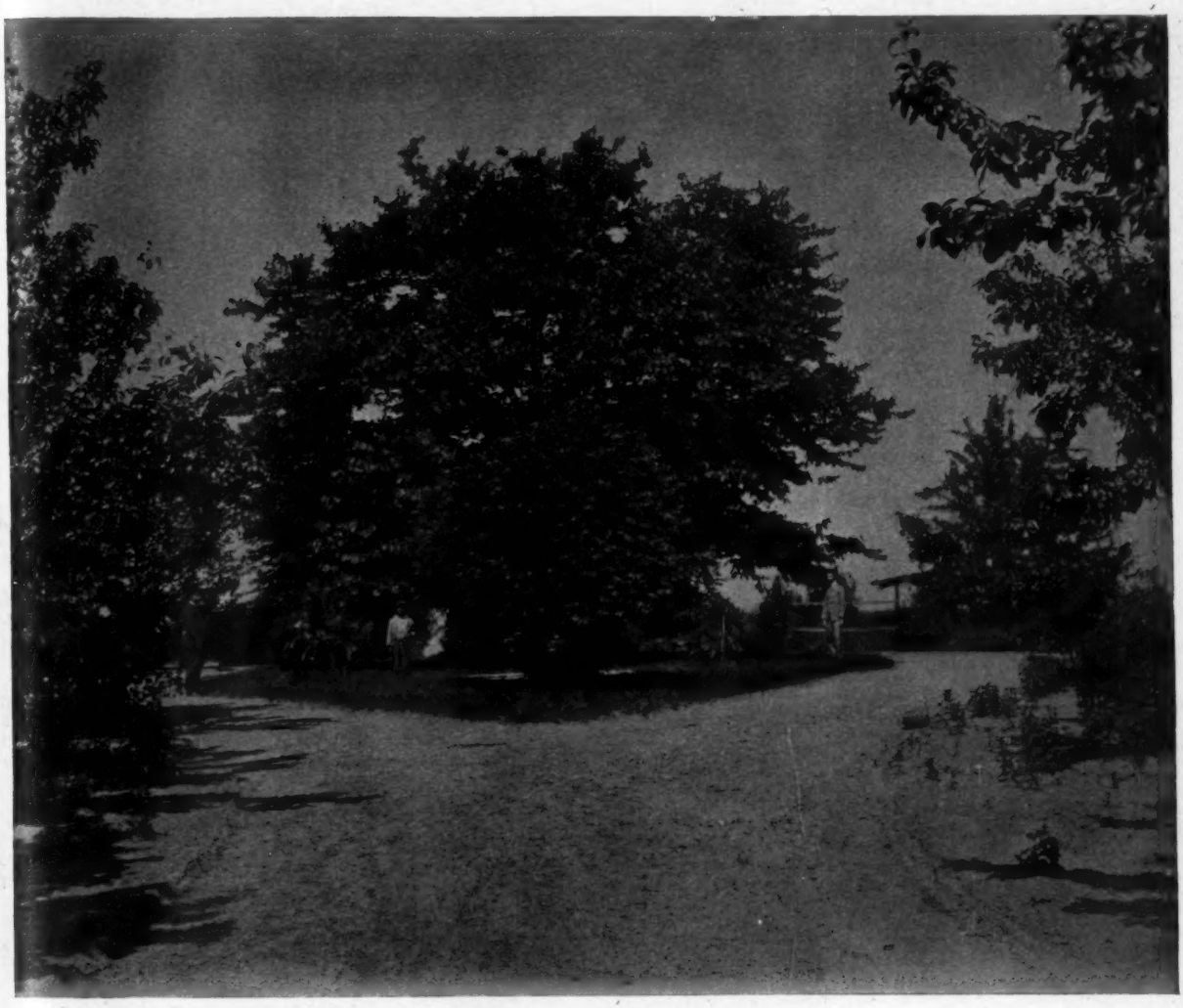

Fig. 3.—A Red Mulberry-tree, Morus rubra, in Alabama.—See page 23.

## Cultural Department.

### Spraying Apple Orchards.

WE have so often urged the advantages of spraying to protect the fruit and foliage of orchards from insects and fungi, and have so often given the details of the best practice, that little remains to be said, and yet thousands of trees in private as well as commercial orchards yield only part of a crop every year because this precaution is

neglected. An interesting bulletin, prepared by Mr. E. G. Lodeman, has just been issued by the Cornell Experiment Station, and it contains the opinions of several practical fruit-growers on this subject. Mr. S. D. Willard, of Geneva, New York, says that "no man engaged in growing apples can afford to dispense with spraying. It should be done, at least, twice in a season and every year, and it will pay a larger percentage on the investment than any other outlay of equal amount." Mr. George T. Powell, of Ghent, New York, writes, after five years' experience in spraying with insecticides and fungicides: "I am satisfied to plan for doing this work in the future more thoroughly than I have ever yet done." Mr. C. E. Chapman corroborates these opinions, and states that his sprayed apples not only "showed less scab, but they were larger and of better color and brought higher prices." We add, in a condensed form, some of the principal points brought out in this bulletin:

Apple-scab.—This is the most serious enemy of the apple-grower. The fungus is active before the leaf-buds open, and the little apples are attacked as soon as the flower is open. It is not known at what season the fungus practically ceases or during what period the apples and leaves are most liable to attacks, nor can it be definitely stated what number of applications are necessary to protect apples from the scab-fungus. As a rule, it may be said that the application should be made at least once before the trees blossom, while two applications are necessary after the falling of the blossoms upon those varieties which are habitually injured by the scab to any serious extent. Upon the most susceptible varieties one or two additional treatments are advisable, while only one or two applications can be made with profit to such sorts as have strong resistant powers to the disease. Such varieties as King, Maiden Blush and Fall Pippins will repay four or, probably, six applications. Red Astrachan can be profitably treated three times, but it is doubtful whether it will pay to make more than one or two applications to the Baldwin or Fallawater.

The Best Fungicide.—In making a choice of remedies, cost, ease in preparing and applying, and adhesive power must all be taken into account, and lately another important factor must be considered, which is the readiness with which the various fungicides may be applied in combination with the arsenites against insects. No one surpasses in all these points, but the Bordeaux mixture seems as yet to be the most effective fungicide. The amount required to spray a full-grown tree is about four gallons, and with proper machinery one hundred and twenty-five trees can be sprayed easily in a day. A powerful pump should always be used, as it requires twice as much exertion to apply a given amount of liquid with a small pump than is necessary when one of ample power is used. All the parts which are exposed to the action of the mixtures should be of brass or brass-lined, for iron soon corrodes. The nozzle used at the station is known as the McGowan, and it gives little trouble by clogging. Trees with spreading tops, like the King and Baldwin, should be set at least forty feet apart, in order to furnish sufficient room for the passage of a wagon. The greater ease with which an orchard may be sprayed when in full bearing is of itself a sufficient argument for open planting of Apple-trees. The arsenites are the approved remedies against the codlin-moth, and no preference can be given to Paris-green or London-purple for this purpose, provided they contain an equal amount of arsenic. The first brood of larvæ can be controlled by two applications of either of the arsenites, and it is doubtful whether any financial gain is derived from later applications. It appears that the Bordeaux mixture and the arsenites are equally effective, whether they are applied alone or together, although Paris-green and London-purple, when applied more than once or twice, may do damage to the foliage, unless their caustic action is neutralized. Lime apparently stops this action if a quarter of a pound, first slacked in water, is put in every forty gallons of the poison mixture.

Results of Spraying.—The foliage of a tree, when kept healthy by spraying, persists longer and does better work, and this is seen in the size of the apples. The size of Fall Pippins was practically doubled by keeping the trees and fruit free from fungus. The increased health and vigor of the tree also intensifies the color of certain varieties, and the keeping qualities of the Fall Pippins and Maiden Blush were apparently augmented, and all these improvements were so evident that in the market the price of the sprayed apples over those not sprayed was increased on an average by $1.00 a barrel by the applications made during the season.

## Vegetables in the Greenhouse.

THE slow, laborious and costly method of forcing vegetables by the use of fermented manure in hot-beds is fast giving way to cultivation in greenhouses. This is certainly more economical, saving time and labor, as also the cost of manure, one-half of which is lost in the process of fermentation, to say nothing of cleanliness. Besides, the results of greenhouse cultivation are impossible with ordinary hot-beds, since under the most favorable conditions only one crop can be taken, whereas two can be obtained from the greenhouse between December and May.

I desire here to give an account of the use we made of the Chrysanthemum-house between the 1st of December, 1892, and June of last year. The house is sixty feet long, containing an area of benches equal to that of twenty hot-bed sash. A raised bench was filled with good rich soil to the depth of six inches, and Lettuce-seed was sown on part of the bench, and the remainder was left for successive plantings. This space might have been used in the mean time for other plants, but this would have involved the risk of introducing aphis. The result was that we never had occasion to fumigate or use insecticides during the whole winter, and those who have been troubled with aphis among Lettuce know what an advantage this was. It was decided to try as many as possible of the principal forcing varieties of the different vegetables in order to determine which succeeded best. As a night temperature of more than fifty degrees, Fahrenheit, could not be maintained, Tomatoes, Cucumbers and Melons, which need sixty degrees or more, were not tried. The very small difference between the various strains of Erfurt Cauliflower was surprising, and, except in the purity of the strains, there was none worth noting. Early Danish was two days earlier than any. Henderson's Snowball was the most even grower. Veitch's Early Forcing, Kronck's Perfection and Farquhar's short-stemmed Early Erfurt were very much alike, and all a little uneven. Among Lettuce, Hettinger's Hot-bed Lettuce was by far the best, and, curious to note, unlike most other varieties of the Tennis-ball, it proved of no use whatever for garden-culture. Henderson's Rapid-forcing Radish was the earliest of all, being ready in from eighteen to twenty days from sowing. This variety was closely followed by French Breakfast and Ne Plus Ultra. The white-tipped, forcing, turnip-rooted variety is about four days later, but is crisper and better flavored. Early Egyptian Beet and French forcing Carrot each took three months to mature.

Old Beet-roots forced nicely for beet-greens, and small Rutabaga Turnips, forced, and cut when about one foot high, make a most delicious dish. Under the bench, room was found for a few roots of Rhubarb, and by putting these in from cold storage we had them in succession during the whole winter.

Asparagus forced equally well under the benches, but from some reason, perhaps because the roots were too old, although they forced freely, the shoots were woody and tasteless. From another experience in forcing Asparagus, I found that it is better to place sashes over beds specially prepared for this purpose, and to line the sides below the ground-level and upward to the top of the frames with dry leaves, for the winter, and in early spring with manure. This method makes the conditions more natural. For green onions for salad we found that shallots forced easier than onion sets, and were equally as well flavored. A patch of Water-cress four feet square furnished all the supply we required.

For succession we planted twelve Cauliflowers and a proportionate quantity of Lettuce-plants and other vegetables each week. The same ground was fertilized and used over again as fast as cleared, only in a different rotation.

Wellesley, Mass. *T. D. Hatfield.*

## Forcing-houses in Dark Climates—Damping Off.

MUCH sunlight is essential to the most successful forcing of fruits and flowers. It is not always best that the sun pour directly upon the plants all day, but the days should be bright and clear. Those portions of the country which are much overcast during winter should be avoided for commercial forcing-business. Our own experience enforces this advice. Ithaca is one of the most cloudy places in the northern states. A bright, clear day in the winter months is unusual, and frequently the sun does not shine an hour continuously for a week and more at a time. Under these conditions plants grow slowly and bear comparatively little; and the greatest care must be exercised in watering and general management to keep the soil sweet, and to avoid the spread of fungi. If I were going into commercial forcing-house work, I should

consult meteorological charts to determine the relative cloudiness of various localities quite as diligently as I should look into market facilities.

I am more and more impressed with the fact that good judgment in watering plants is rare. This is especially true in all such soft plants as Lettuce, Beans, Cucumbers and Muskmelons. If the surface of the soil is constantly wet and hard, the various fungi which cause damping-off will thrive. The common Botrytis, which, until recently, was thought incapable of attacking living tissue, will spread rapidly upon the surface of a wet bed, and it will often attack labels in full confidence of victory. In order to avoid the rotting of Lettuce and damping-off of plants, we water only on sunny days, so far as possible, and we then soak the bed thoroughly. When the water is thoroughly settled away, the bed is stirred up on top, so that it will dry out. Constant or frequent wetting of the surface, which is so common among amateurs, is fatal to success in many plants, especially in dark climates. If the air is too dry, wet down the walks; but do not putter with the beds. If, in spite of this precaution and care in ventilating, the Lettuce-rot or damping-off fungi make their appearance, make a liberal sprinkling of sulphur over the bed and stir it lightly into the soil. I am convinced that sub-irrigation, as shown by tests at the experiment stations in Ohio, West Virginia and at this place, is the ideal method of watering greenhouse-beds.

Ithaca, N. Y. *L. H. Bailey.*

## Ipomœa Leari.

THERE are some flowers of such surpassing beauty that when we behold them for the first time we can only gaze in silence. Such a flower is Aquilegia cœrulea and such a one is Ipomœa Leari, in my opinion, the most beautiful of its genus or order. I suppose, but do not know, that this is the plant which appears in the fantastic nomenclature of the catalogues as the "Heavenly Blue Moon-flower." If so, it is a matter of some satisfaction to know that so lovely a thing is obtainable at a trifling price. The flowers are about five inches in diameter, and are borne in clusters, three or four being open at once; they last but a few hours, but as the buds on the scapes frequently number more than twenty, and as new scapes are constantly forming during warm weather, the display is kept up for months in undiminished beauty. A few clusters on the breakfast-table are a delightful ornament, and every bud on the stem will open if it be kept in water. Each flower will be of the same cœrulean tint, however small the bud may be when it opens, for the buds will not grow after cutting, but will display their blooms in ever-diminishing size, the last ones so small as to be almost grotesque.

A few summers ago I allowed a plant of this Ipomœa to have its own way in the modest affair which I call my greenhouse. It grew with amazing rapidity, thrusting its long, and at first nearly leafless, shoots over the benches and among the pots and along the roof and floor. These shoots developed roots, which struck into the pots and into the earthen floor, and at the same time axillary shoots started at each leaf, which in their turn produced flowers and new growths. All summer I could have gathered hundreds of flowers every morning, but of all the thousands which were not plucked not one produced a seed. When I needed the room in September to stand my pots of bulbs, the labor of cutting away and carrying out so many armfuls of Ipomœa growth was so great that I have never since allowed it to stray at will.

As far as my experience goes, it is useless to attempt the culture of Ipomœa Leari out-of-doors, for, though it grows vigorously and flowers abundantly when so planted, the blossoms come of a dull coppery purple color, and are not as pretty as the ordinary Morning-glories.

Canton, Mass. *W. E. Endicott.*

**The Otaheite Orange.**—I do not know one other plant for general house-culture equal to this dwarf Orange. I have one which has been in bloom all winter, besides carrying a dozen oranges from a former flowering among its bright glossy leaves. It generally carries a dozen ripe oranges, besides green ones. The fragrance is, of course, delightful. I keep it as a special pet for my study. Liking some sunshine, it nevertheless does well in the shade. It stands about twenty inches high above the pot and spreads out over a diameter of more than two feet. After a plant makes this size it should be in a ten-inch pot, and thereafter need not be moved for many years. I have a plant standing in soil which has not been removed nor enriched for five years, yet the tree is very luxuriant and prolific.

Clinton, N. Y. *E. P. Powell.*

**Hardy Andromedas.**—At this season of the year Andromeda Japonica, with its rose-colored racemes of flower-buds which seem all ready to expand with the first long day of spring, and its abundant evergreen leaves, makes altogether an interesting sight. The flower-buds on A. floribunda are not colored so highly nor are its leaves so glossy, but still it is beautiful, and very valuable as a hardy evergreen shrub. Flower-buds of Leucothoë Catesbæi are of a deep rose color, and its foliage is also very attractive. A little later on, the leaves of this shrub will become bronzed and the color of the flower-buds much more prominent. L. recurva is a deciduous shrub, but its large racemes of rose-colored flower-buds are now most interesting.

Germantown, Pa. *J. Meehan.*

**Begonia Gloire de Lorraine.**—This plant, from Messrs. Lemoine, adds another distinct plant to the series of hybrids of Begonia Socotrana. As is well known, this species is, perhaps, the most desirable of the Begonias for decorating conservatories in the winter from the fact that its flowers are more persistent than any others of the family. They endure for weeks, and, unlike other species of the genus, show no tendency to drop at every change of temperature or mistake in watering. Gloire de Lorraine is a hybrid between B. Socotrana and a summer-flowering Cape species, B. Dregii, which has a thickened root-stock and bears white flowers. The stems are numerous, rather thin and pinkish, and bear numbers of rosy flowers, much brighter in color than those of Triomphe de Lemoine, the last new hybrid offered by the same grower. The leaves of the new plant are also much more attractive, and show the influence of the Cape parent, while the leaves of the former are subpeltate and uninteresting. Flowers of Triomphe de Lemoine persisted on my plants last season some three months, and it is to be hoped that the new hybrid will show the same valuable habit. It can apparently be increased with ease from cuttings. The Socotrana hybrids now comprise the following varieties, which are all valuable and distinct plants: Gloire de Sceaux (Thiébaut & Keteleer), Winter Gem (Veitch), Adonis (Veitch), John Heal (Veitch), Bijou, Triomphe de Lemoine, Triomphe de Nancy and Gloire de Lorraine.

**Calochortus Kennedyi.**—Mr. Edward Sturtevant lately sent me some bulbs of this beautiful red-flowering Mariposa Tulip, which he collected lately in southern California, 150 miles from Los Angeles, with a sample of the material in which they were found. This material is a most interesting exhibit, and is helpful as showing one of the conditions in which the plant thrives. It seems to be composed almost entirely of well-decomposed stone, evidently granitic, from the glistening mica scales. It is dark in color, with only a small proportion of mold. It contains apparently not a trace of clay or compacting matter, and, judging from this exhibit, the bulbs of this Calochortus are in well-drained places with no decomposing or fermenting matter near them. Not many of us have such material in which to plant, though the drainage is easily managed. The nearest easily available material with the same texture that I can suggest is burnt earth with a trace of loam or leaf-mold. Mr. Sturtevant says he had to gather the stock with a pick, as the ground was very hard and dry in November, and the bulbs were resting some six or eight inches deep, out of reach of the frosts which sometimes occur in the locality, which is on the hills, 3,000 feet above sea-level. This would again indicate that we must keep these bulbs dry, under cover, later than I had supposed necessary. The bulbs received are plump and show no indication of moving, though some which have been in a pot outside with the Dutch bulbs, and covered with leaves, have been moving several weeks.

Elizabeth, N. J. *J. N. Gerard.*

# Correspondence.

## Horticultural Progress in France.

To the Editor of GARDEN AND FOREST:

Sir,—Some interesting steps are contemplated by the City Council of Paris for the improvement of the horticultural work in the public gardens and parks. It has been known for some time that the municipal nurseries at La Muette were to be removed, *extra muros*, into the grounds of the Bois de Boulogne. Two advantages are to be derived from that step—the location of the new propagating establishment is to be much larger and in better condition, as far as pure air is concerned, and a good amount of it fit for building-ground will be set free by the scheme, and, beyond doubt, the sale of that ground will defray most of the expense needed for starting the new nurseries.

The location of the new establishment is close to the fortification ditch and between the Bois de Boulogne entrance at La Muette and the Porte Dauphin—the main entrance from the Champs Elysées.

This, however, is but a material improvement. Much more interesting subjects have been under discussion during the last fortnight, and it has been determined to make a complete pomological collection on some grounds belonging to the city, in quite a different location—the Bois de Vincennes. These two municipal establishments will then be opposite each other, east and west of Paris, and quite close to the walls of the city.

All Frenchmen who are more than fifty years of age, and interested in pomology, will remember the pomological collections at the Pépinière du Luxembourg. There our best professors gave their lectures to a large audience of professional and amateur pupils. The collection of Grapes was specially large and celebrated. The reduction in the area of the Luxembourg grounds caused the much-regretted dispersion of the collections; and these grounds, which before the Revolution had contained the celebrated nurseries of the Pères Chartreux, who were, in fact, the first originators of the collections, retained but a limited number of fruit-trees, almost exclusively Pear-trees.

It seems to be a happy thought of the Parisian authorities to renew the tradition of patronage given by the French capital to horticultural studies. As far as the present projects are elaborated, space and financial resources will be granted for the pomological collection, special attention being given to the Vine. The grounds will need some improvement, but these obstacles are of small moment when we consider the unlimited resources of this city in workmen and machinery.

The city has already established a school of arboriculture in the Bois de Vincennes, quite near to the Porte Daumesnil. In this place are cultivated all the ornamental trees and shrubs that are used in the parks, squares and avenues of Paris. In fact, many other beautiful and interesting trees and shrubs have been gathered there by the learned director of the school, Professor Charguéraud, and were it not for its lack of size and the inferior quality of the soil, the Ecole d'Arboriculture could be made an arboretum of the highest character. A well-selected orchard, although limited in size, is part of the school, and some forty young people receive there very good horticultural instruction almost free of charge.

The new grounds for the pomological collections will be just opposite the Ecole d'Arboriculture, and it is thought by many of the City Council that some space should be reserved for floriculture, and that a general faculty for teaching horticulture should be founded in connection with these new establishments. Vincennes and Neuilly are close to the Porte Daumesnil, near which a number of market-gardeners live, and instruction in the cultivation of vegetables would naturally become a part of the programme of the contemplated school. Anything that distinctly promotes horticulture or any of its branches in France will be a public boon.

The elections are just over at the French Horticultural Society. The First Vice-President, Monsieur Henri de Vilmorin, was re-elected for two years. Some slight changes were made in the staff of the society, the newly elected ones being actual horticulturists. Amateurs and scientists are replaced by intelligent men who make a business of horticulture. No doubt, it is best for a national society to have a fair proportion of its members chosen from every class.

Botanists will be glad to know that the Abbé Delavay, who has collected so many new plants and seeds, is again in western China. Some new discoveries are to be looked for, unless he is prevented by his failing health, which has been much shaken by his long residence and apostolic work in China. A good many Chinese plants have also been received at the Jardin des Plantes as dried specimens from other French missionaries in western China, and a number of species are soon to be described.

The taste for dendrological collections is, fortunately, not extinct in France, but I can only speak here of one experiment of cultivation in pure sand, made near the sea-shore in Brittany, by an amateur. It had been asserted that no garden could be made near St. Malo, and that no tree or shrub, except the Tamarisk, could survive there. But, notwithstanding many outspoken predictions of failure, our friend began many trials with native and exotic plants. He has succeeded beyond all expectation, and has now a good selection of trees in his garden. The gray foliage of Populus Bolleana towers above a dark green mass of Monterey Cypress, while Elæagnus angustifolia and other species of this genus, with the common and purple Barberries, give a rich variety of color. Even a lawn was created in the clear sand by planting young seedlings of Bupleurum fruticosum and cutting the shoots evenly at some six inches from the ground. To me this seems an achievement worth putting on record.

Paris. *X.*

## Local Climates in California.

To the Editor of Garden and Forest:

Sir,—During the holiday week I went up the mountain-side immediately behind the town of Ukiah. The weather was perfectly clear, although there had been a rain-storm a few days before; the thermometer stood at about twenty-five degrees, Fahrenheit; the mud was frozen hard and frost crystals showed everywhere in the loose soil. At about 200 feet above the level of the town I reached a belt where, instead of frost, there was a dew and an air like that of spring. This belt was about a quarter of a mile wide, and perhaps the difference in altitude of its two borders was 300 feet. Above this I came again to frozen ground and frost crystals. At both edges of this belt the line was so sharply drawn that two rods rarely intervened between the frozen and the frostless ground. The soil at this point of the hill-side, though of good quality, is not cultivated, but half a mile to the southward a grove of twenty-five Orange trees, which are now loaded with good fruit, is flourishing near the lower edge of the warm belt. On Christmas-day a correspondent wrote from Sky Ranch, which is north of this place and 1,600 feet above the sea-level, that his Strawberries and Raspberries were in bloom and showing ripe fruit; that the leaves were still green on his deciduous trees; that Limes, Lemons and Oranges were thriving.

These thermal belts I shall not try to explain, and eastern people are often puzzled over the statement that oranges ripen sooner one hundred miles north of San Francisco than in southern California. The northern Citrus belt, as it is called, is only a repetition, on a large scale, of this phenomenon which I have described—namely, a belt lying within certain altitudes on the mountain-slopes. It is only within recent times that these warm zones have been studied closely, but better acquaintance with them has demonstrated the fact that they exist throughout the northern part of this state, and that in many places where the Citrus and other tender fruits will not live in the valley climates, there are points near at hand in the same latitude where they are safer from frost than they are several degrees farther south. As yet these facts are put to comparatively little practical use, but as the country becomes more thickly settled it is not improbable that these elevated warm lands will be much sought for. It will be very important to know how much these belts vary in altitude from year to year, if, indeed, they practically vary at all, and whether the cutting down of the woods and other changes in the earth's surfaces which are made by man will have any effect upon them.

Ukiah, Calif. *Carl Purdy.*

## Recent Publications.

*Maize: A Botanical and Economic Study.* By John W. Harshberger, Ph.D. Philadelphia: 1893.

This is the second part of the first volume of *Contributions from the Botanical Laboratory of the University of Pennsylvania*, and its one hundred and twenty-five beautifully printed pages, with maps and plates, summarize in convenient and systematic form our knowledge of Indian Corn. The evidence that the plant originated in a region of restricted limit somewhere north of the Isthmus of Tehauntepec and south of the twenty-second degree of north latitude and more than 4,500 feet above the level of the sea, is marshaled in a very convincing way by Mr. Harshberger. Eminent botanists have claimed that the cereal is indigenous to the Eastern Archipelago; others hold that China is its original home; others still, consider Japan the place of its origin, but the arguments when thoroughly sifted amount to little, and the elaborate array of evidence from archæology, history, ethnology and philology which is here adduced to show that Maize is of American origin is substantiated by facts from botanical and meteorological science. It is ingeniously argued that the Mayas first cultivated Maize, and since it is probable that this people did not emerge from savagery until after the Christian era, the beginning of its cultivation is therefore fixed after that date. From them it probably passed southward through the Isthmian tribes to Peru and Chili, and was carried by the

Caribs from the South American continent by the way of Guiana and the West Indies to Florida. A map of the Western Hemisphere is given, which shows its original home, the limits of its primitive cultivation, its distribution in North and South America before the year 700 A. D., and its limits in the year 1000. Grains of it were sown in Spanish, Italian, French, German and English gardens in the sixteenth century, and it was soon naturalized in Turkey, the Danubian countries and Hungary. It soon spread to other regions, and it is now grown throughout both American continents, in the plains which border on the Pyrenees and the valleys which descend from the Jura, throughout Italy, Austria and Hungary. It is cultivated in Asia Minor, India, China, the Philippine Islands, the Malay Archipelago and Australia, and furnishes in all these places a most important food for man and beast.

The careful arrangement of the arguments which establish the origin of the plant is preceded by a botanical chapter on its gross anatomy and histology, together with an elaborate bibliography. After this comes a careful study of the chemistry of the plant to determine its value as food, and to show what elements it takes from the soil and to explain how its by-products can be utilized. A discussion of the physiological properties of the plant in relation to its cultivation is most interesting, as the facts adduced explain why the Corn crop is especially valuable in arresting the waste of nitrogen from the soil. The varied uses of the plant as food for man and domestic animals, as a medicinal plant and in the production of sugar, paper and oil, as well as other economic purposes, are then discussed, and it may be noted as a point of interest here that the cobs yield a large supply of potash. A mill which will shell five hundred bushels of corn in an hour turns out 70,000 pounds of cobs in a working-day, which are used as fuel in the mill. The refuse ashes are collected, and as they contain more than seven per cent. of potassium carbonate, a factory of the above capacity would produce 535 pounds of this chemical in a day. A brief chapter on the relation of this crop to the agricultural prosperity of the country is interesting, if not altogether convincing, but the point seems clear that the increased export of maize would be a sure and practical benefit to the farming interests of the country, and it is quite possible, as Mr. Harshberger holds, that this greatest arable crop which we grow, the crop which occupies the largest portion of the cultivated area of the country, and has never been known to fail, is destined to occupy the place in America that rice fills in India, China and Japan, that cassava fills in South America, and that sago occupies in Borneo, Java and the Indian Archipelago—the staple food of man.

---

*How to Grow Cut Flowers.* By M. A. Hunt. Published by the author. Terre Haute, Indiana.

The wonderfully rapid growth of the trade in cut flowers throughout the country during the last fifteen years has proved a great stimulus to American enterprise and invention, and no branch of horticulture has seen more marked changes in methods practiced and of appliances used than commercial floriculture. The entire system of constructing greenhouses and heating them has been practically revolutionized, and the manner of cultivating different kinds of flowers has been so completely changed that old treatises on the subject are almost useless as manuals of every-day practice. That Mr. Hunt's volume, published a year ago, supplied an urgent need is proved by the fact that a second edition has already been called for, and the thousands of people who are interested in a business which represents millions of capital will be glad to have this handbook of ready reference. In comparatively small towns all over the country wide-awake young men are embarking in floriculture as a business, and a volume like this, if habitually referred to, will prevent many costly mistakes and discouraging experiences. Of course, nothing takes the place of personal study and observation, but advice like that offered in this book from a man who has been educated in the hard school of experience, and who remembers his own failures as well as his successes, will, no doubt, be of great value to many beginners as well as to those who are already conducting active business. The first chapter, on greenhouse-construction, gives in a condensed form the argument for the three-quarter span with a southern exposure, and explains all the modern improvements in glazing and ventilation. The best methods of heating by steam and by hot water, and their comparative value, are also set forth at length. The latest results of the studies in our experiment stations on the diseases incident to plant-life, as well as the insects which are injurious to plants, are brought together in a compact form, so that the struggle with these enemies can be conducted with intelligence and the best modern appliances. The cultural notes on various plants, together with the methods of propagation, will be found of interest to every owner of the smallest greenhouse as well as to commercial florists; and the practical answers here given to the hundreds of questions which come up every day for decision by every one who has the care of even the smallest collection, will be found, in the main, sound and helpful. The index is very complete, so that the learner will have no difficulty in finding just what he wants.

---

*Letters to Marco.* George D. Leslie, R. A. New York: McMillan & Co.

This is a collection of letters which were actually written, and they are the record of observations on the commoner plants, birds and other natural objects in the counties of southern England. They are far from being scientific, however, and show little of the spirit of research, but are the spontaneous expression of one who loves nature for its own sake. They contain, therefore, no great amount of information, but, after all, make pleasant reading for a casual half-hour when opened at random. It is the pictorial aspect of things which always appeals to the writer, and if he never ventures any profound observations upon subjects which come within the range of his experience, he is always ready to throw off a little word-painting which will linger in the memory and stir the imagination. There are many illustrations, too, which are evidently copies of the hasty pen-and-ink sketches which originally accompanied the letters, and they are more truly in harmony with the text than more elaborate drawings would be.

---

## Notes.

The authorities of the State University at Seattle, in Washington, are about to establish an arboretum on their campus, three hundred and fifty acres being devoted to the purpose.

The American Dewberry, probably Rubus trivialis, is said to have borne fruit profusely in the Shaharanpur Botanic Gardens, and it promises to be one of the most important of the exotic fruits recently introduced into India.

We have received from Mr. E. E. Risien, of Texas, some nuts which he calls the Royal Paper-shell Pecans. The nuts are of large size, and the shell is so thin that it can be broken between the thumb and finger. The meat is of excellent quality, and is about the same size and form as that of a good-sized Hickory-nut. Some persons who visited the Horticultural Building at the Columbian Fair may remember Mr. Risien's exhibit of nuts and his interesting series of photographs to show how large wild trees have been top-grafted with cions of these fine varieties.

The last part of the *Dictionnaire Pratique d'Horticulture et de Jardinage* carries this important work through Deutzia. It is, it will be remembered, the French edition, much enlarged and improved, of Nicholson's *Dictionary of Gardening*. It is published by Octave Doin, 8 Place de l'Odéon, Paris, and will be finished in eighty parts, of which twenty have now appeared, each part containing forty-eight pages and a colored plate in addition to the numerous wood-cuts in the text. The price of each part is one franc and a half, or ninety francs in advance for the complete work. The *Dictionnaire Pratique*

*d'Horticulture* is one of those invaluable works of reference which should find a place in every botanical and horticultural library.

Thirty-nine different sorts of Indian woods have been tested at the Forest School in Dehra during the past twelve years, the experiments being made with perpendicular posts, half under and half above ground. Recently it was found that only three of the posts remained sound—those of Himalayan Cypress-wood, Teak and Anjan-wood. These had been exposed, respectively, for ten, nine and seven years, and were in excellent condition, while all the other sorts had fallen a prey to rot and the attacks of white ants.

Professor Wickson, of Berkeley, California, is sending out plants of what is called the Logan Berry, which appears to be a cross between the cultivated red Raspberry and a variety of the California wild Blackberry. It was raised from seed by Judge J. H. Logan at Santa Cruz in 1884, and bears fruit of striking characteristics. The berry is sometimes an inch and a quarter long, shaped like a blackberry, colored like a dark red raspberry, and combines the flavors of the two fruits. It is hard and ships well, and has been successfully marketed in quantity. On the experiment-grounds of the University Station it has fruited for three years; the foliage seems rust-proof, and no other disease has been noticed on the plant.

No European town has been more conspicuously improved in recent years than Sofia, the capital of Bulgaria. A series of splendid boulevards has been cut through the mass of old narrow streets and Turkish houses, one encircling the city, while others run across it in various directions; and a still more spacious avenue, 197 feet wide, and set with six rows of trees, leads from the centre of the town to the railway-station, while another, called the Boulevard Stambouloff, runs from the same point to the new park. This park is very large, and is said to be well planted. A great public garden has also been formed in the middle of the town, with smaller gardens at various points, and a nursery, covering a hundred acres, has been established in the suburbs, where plants will be grown for the public grounds, and will also be sold to private purchasers.

Last week the temperature was lower in California than it has been in twenty years, the mercury in many parts of the Orange-growing sections indicating from four to six degrees below freezing. As the oranges are just approaching maturity, the result would have been very damaging unless artificial means for counteracting the effect of the frost had been used. As a precaution, gas-pipes had been laid in many groves, and the gas was burned at night to elevate the temperature above the danger-point. In other groves piles of wood, saturated with coal-tar, had been arranged at intervals, and when these were set on fire a dense smoke was created, which covered the orchard like a cloud and protected the fruit. Probably no more than five to ten per cent. of the crop will be lost in Riverside, Los Angeles and San Bernardino counties. As the crop is one-third larger than it was last year and of fine quality, the loss will hardly be felt.

In the January number of the *Botanical Magazine* there is a figure of Erythroxylon Coca, of South America, interesting as being one of the plants from which the active alkaloid cocaine is obtained. The leaves of this plant are used in immense quantities from one end of South America to the other as a masticatory for maintaining and restoring muscular strength; and "its cultivation covers an enormous area; Bolivia produces 7,500,000 pounds of the dried leaf annually, Peru 15,000,000, and the product of the Argentine Republic, together with that of parts of Brazil, must be enormously greater." In spite of the universal belief in the value of the leaves in South America, Dr. H. H. Rusby, of the New York College of Pharmacy, who has lately made a careful study of the physiological action of cocaine and has published the result of his investigations in the *Therapeutic Gazette* of this city, under the title of "Cocoa at Home and Abroad," demonstrates that "the effects of cocaine as a nerve stimulus applied to intellectual and emotional activity are ruinous. It takes away appetite, abolishes the sensations of hunger and thirst, lessens waste during exertion, and decreases the exhaustion of ill-fed laborers and travelers. Beyond this, cocaine has no supporting or nourishing power whatever, and its essential action is enfeebling. Every attempt made to support by it athletic competition has resulted in failure, or even disaster."

Excepting Orchids, cut flowers are still lower in price than during the holiday season. Next to cattleyas and cypripediums, roses are more generally used than any other flowers in expensive arrangements, and although only three or four immense buds of American Beauty are used together in a vase, the supply of these flowers is taken up each day. They cost a dollar to a dollar and a half apiece. It is said that these flowers are more often used to invite attention to the costly vases which contain them than for their own beauty. Tea roses of choice quality cost two dollars and a half and three dollars a dozen, a third less than the price at New Year. A hundred double violets now cost only a dollar and a half, the less fragrant single violets but fifty cents. The first freesias of the season are fifty cents a dozen, and tulips and narcissus cost two or three times as much. The demand for growing plants for home decoration is steadily increasing, and the supply of some kinds, like the Otaheite orange, for example, has been almost entirely exhausted. Good flowering-plants of Laurestinus, in pots, are occasionally seen, and Camellias are likely to become fashionable once more, as the flowers are even now often called for, to be worn in button-holes. Leaves of Galax aphylla, from North Carolina, are much used in mantel decorations, and even in combination with Orchids, instead of more delicate foliage.

Mr. E. G. Hill, in a late number of the *Gardeners' Magazine*, of London, calls attention to the fact that several of the Chrysanthemums to be distributed in 1894, and certificated at various exhibitions as the best of a specified color, did not come into competition with each other. It has heretofore seemed impossible to exhibit all the new varieties together in one place. Again, in some shows the right to give a name to a prize-winning seedling has been reserved by the individual offering the premium. As the exhibitions in different parts of the country were held during the same week, and some schedules required seedlings to have a name attached, these conditions prevented the competition of the same varieties in different cities. The need of a central tribunal is suggested, whose decisions will be received as authoritative, where all new Chrysanthemums may be compared and judged. In this same article, Mr. Hill expresses surprise that some of the varieties most highly esteemed in America are never seen on the exhibition lists in Great Britain. Among these are H. E. Widener, Mrs. Jerome Jones, Golden Gate, Edward Hatch, Ivory, Flora Hill, Harry May, Mrs. Maria Simpson, Minnie Wannamaker, Mrs. A. J. Drexel, Frank Thomson and Harry Balsley. The query is all the more pertinent since such varieties as C. B. Whitnall, Eda Prass, George W. Childs and Colonel W. B. Smith seem to do well in England, and from the success of these varieties under English methods of culture and in the climate of that country, it is reasonable to suppose that other American varieties would do equally well there.

Flame Tokay and Emperor grapes, held in cold storage since the last of November, are still offered, but on account of inferior condition they do not command as good a price as they did when they first arrived. Catawba grapes, from western New York, have advanced in price to twenty cents for a five-pound basket. While choice Florida oranges, from the Indian and Halifax River districts, are in demand at $2.25 a box, at wholesale, fairly good fruit can be had for a dollar less, and is retailed on the street-stands as low as fifteen cents a dozen. Fancy grades of Tangerines and grape-fruit have a steady sale at good prices, but lower grades are without buyers, and Mandarins find few purchasers at even very low prices. Several cargoes of Mediterranean fruit will soon be added to the large supply from Florida, 178,000 boxes of lemons and 21,000 boxes of oranges being now on the way to New York, Philadelphia and Boston. Spitzenberg apples and Newtown Pippins are favorites in the stocks of retail fruiters. These sorts and good Baldwins bring the highest price, six dollars a barrel. Hot-house strawberries, from New Jersey, have fallen fifty per cent, that is, to $1.50 for a small cup of large and beautiful berries. Field-grown pineapples, from Florida, cost thirty-five cents, and those grown under glass in the same state sixty to seventy-five cents each, while luscious specimens of this fruit from English hot-houses sell readily at a dollar and twenty-five cents each. Among vegetables now in market are new carrots from Charleston, and spinach and kale from Norfolk; tomatoes from Key West and Florida are as low as fifteen cents a quart, while new beets, from Florida and from Bermuda are only five cents a bunch. The best cucumbers come from Boston hot-houses, and these cost twenty cents each. Forced rhubarb from New Jersey costs twenty cents for a few small stalks. Hot-house asparagus is now an expensive luxury, a half-pound of tender stalks costing a dollar and a half. This vegetable does not come from Charleston until March, although a limited supply from further south reaches here earlier.